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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jian Gu

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02/07/2006

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EXAMINER

TRAN, KHANH C

ART UNIT

PAPER NUMBER

2631

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/922,019

Applicant(s)

GU, JIAN

Examiner

Khanh Tran

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 47-71 is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9-12,15,24,26-30,32-35 and 38 is/are rejected.
- 7) ☒ Claim(s) 2,8,13,14,16-23,25,31,36,37 and 39-46 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 14 is objected to because of the following informalities: in line 2, "demodulator" should be changed to -- demodulator --. Appropriate correction is required.

2. Claim 16 is objected to because of the following informalities: in line 1, "the first" should be changed to -- a first --. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-7, 9-12, 15, 24, 26-30, 32-35 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson U.S. Patent 5,726,973.

Regarding claim 1, in column 7 lines 45-67, referring to figure 10, Isaksson teaches a method for synchronization in OFDM (orthogonal frequency division multiplexing) modulation, whereby frequency errors in an IF (intermediate frequency) clock and a sampling clock are controlled by estimating the deviation

of the sampling clock and of the IF clock for two subcarriers with different frequencies ( $k_1$  and, respectively,  $k_2$ ). The different frequencies ( $k_1$ ,  $k_2$ ) are symmetrically around zero.

Referring to figure 10, the first combiner + is coupled to absolute phase error (Theta 2) to combine the first phase error to a second signal to form a first control signal (F1) from the deviation of the sampling clock and the timing error for controlling the sampling clock. Theta 2 corresponds to the claimed first balancing signal.

Isaksson does not expressly teach a first balancer to generate a first balancing signal.

As recited above, because the absolute phase errors theta 2 form a first control signal (F1) from the deviation of the sampling clock and the timing error for controlling the sampling clock and a second control signal (F2) from the deviation of the IF clock and the phase error for controlling the IF clock, one of ordinary skill in the art at the time the invention was made would have recognized the ARC-TAN block performs equivalent function of the claimed balancer to generate an absolute phase error.

Regarding claim 3, as recited in claim 1, the first combiner + performs subtraction depending polarity of the input signal.

Regarding claim 4, in column 8 lines 30-40, because Isaksson suggests scaling the phase error by said suitable scaling factor before the step of adding the deviation of the IF clock to the phase error to form the second control signal (F2), it would have been obvious for one of ordinary skill in the art at the time the invention was made that Isaksson teachings can be modified to use a complex factor as claimed in the application claim.

Regarding claim 5, as recited in claim 1, Isaksson method uses two subcarriers with different frequencies ( $k_1$  and, respectively,  $k_2$ ), which are symmetrical around zero.

Regarding claim 6, referring to figure 9, the  $k_1$  signal is a demodulated signal.

Regarding claim 7, referring to figure 10, similar to the argument in claim 1, the second combiner + is coupled to absolute phase error ( $\Theta_1$ ) to combine the first phase error to a first signal to form a second control signal (F2) from the deviation of the sampling clock and the timing error for controlling the sampling clock.  $\Theta_1$  corresponds to the claimed second balancing signal.

Regarding claim 9, claim 9 is rejected on the same ground as for claim 3 because of similar scope.

Regarding claim 10, claim 10 is rejected on the same ground as for claim 4 because of similar scope.

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Regarding claim 11, claim 11 is rejected on the same ground as for claim 5 because of similar scope.

Regarding claim 12, claim 12 is rejected on the same ground as for claim 6 because of similar scope.

Regarding claim 15, the original subcarrier with frequency  $k_1$  is transmitted and received by the receiver in figure 9.

Regarding claim 24, claim 24 is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 26, claim 26 is rejected on the same ground as for claim 3 because of similar scope.

Regarding claim 27, claim 27 is rejected on the same ground as for claim 4 because of similar scope.

Regarding claim 28, claim 28 is rejected on the same ground as for claim 5 because of similar scope.

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Regarding claim 29, claim 29 is rejected on the same ground as for claim 6 because of similar scope.

Regarding claim 30, claim 30 is rejected on the same ground as for claim 7 because of similar scope.

Regarding claim 32, claim 32 is rejected on the same ground as for claim 9 because of similar scope.

Regarding claim 33, claim 33 is rejected on the same ground as for claim 10 because of similar scope.

Regarding claim 34, claim 34 is rejected on the same ground as for claim 11 because of similar scope.

Regarding claim 35, claim 35 is rejected on the same ground as for claim 12 because of similar scope.

Regarding claim 38, claim 38 is rejected on the same ground as for claim 15 because of similar scope.

***Allowable Subject Matter***

4. Claims 2, 8, 13-14, 16-23, 25, 31, 36-37 and 39-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 47-71 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 47, claim 47 is allowed over prior art of record because the cited references cannot teach or suggest a system comprising "a balancing unit coupled to the bank of demodulators to restore P original signals from the P demodulated signals, the balancing unit including P basic blocks".

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Andre U.S. Patent 6,668,024 B1 discloses "Radiofrequency Transmitter With A high Degree Of Integration And Possibly With Self-Calibrating Image deletion".



Wiss U.S. Patent Application Publication No. US 2002/0097812 A1 discloses "In-Phase And Quadrature-Phase Rebalancer".

Alelyunas et al. U.S. Patent 5,705,949 discloses "Compensation Method For I/Q Channel Imbalance Errors".

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

*Khanh Cong Tran*

02/03/2006

Examiner KHANH TRAN